

# PATENT SPECIFICATION

DRAWINGS ATTACHED

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## COMPLETE SPECIFICATION

### Improvements in or relating to Illuminated Indicator Dials and Scales

We TELEFUNKEN PATENTVERWERTUNGS G.m.b.H. of Ulm/Donau, Elisabethenstrasse 3, Germany, a German company do hereby declare the invention, for which we pray 5 that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to illuminated indicator dials and scales and though not limited 10 to its application thereto, is primarily intended for and very suitable for use for, the tuning dials of transistorised radio receivers.

It is well known to illuminate radio receiver and similar dials by mounting so-called pea lamps behind a glass plate which constitutes the dial and on which indicia such as frequencies and/or transmitting 15 station names are inscribed. It is also well known to floodlight such dials. Another known proposal for obtaining an illuminated dial is to use a so-called luminescent plate which will light up on the application of a predetermined alternating voltage and arrange 20 electrodes, one of which is transparent, so that the whole area of the plate lights up, and mask the plate by a stencil with indicia cut in it. Although the power consumption 25 of such an arrangement is small it is still, however, inconveniently large in some cases, notably in the case of portable transistorised radio receivers.

According to this invention an illuminated 30 dial has indicia which light up by electroluminescence provided by a layer of luminous material which is placed between two electrodes, the electrode towards the observer consisting of a metal wire in the shape of 35 the required indicia and the arrangement being such that an electrical field formed 40 between the two electrodes activates the

luminescent layer to light up to a width which is greater than the diameter of the wire which appears dark.

The invention is illustrated in and further described with reference to the accompanying drawing in which:—

Figure 1 is a simplified sectional view of 45 one form of luminous plate in accordance 50 with the present invention:

Figure 2 is a full view of a radio receiver 55 dial in accordance with the present invention, and

Figure 3 shows a suitable circuit for 55 exciting.

Referring to Figure 1, the luminescent plate comprises a layer 1 of luminous material placed between an electrode 2 which is made up of wires bent to the appropriate shapes corresponding to the required indicia and a layer electrode 3. The assembly so far described is placed between a backing 4 and a covering layer 5. The covering layer 5 is a transparent enamel or plastic layer; and the supporting layer 4 is of enamelled metal. If a suitable alternating voltage is applied between these two electrodes 2 and 3 the layer of luminous material 1 is excited by an electric field (represented by lines 15 and 16) between the wire electrode 2 and the layer electrode 3 over a greater width than the diameter of the wire 2 so that the indicia appear on the dial as dark strips, letters or figures, as the case may be, outlined by thin bright borders. The individual letters and figures comprising the indicia are preferably suitably connected to a common straight baseline wire running across the dial.

Referring to Figure 2, the dial is traversed by a dark pointer 11 which provides a moving mark where it intersects the luminous

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strip. However by designing the wire electrode 2 to provide further marking such as 13 or words such as 14 a very clear and full dial display is obtained. Where there are several wavelengths tuning range scales with a number of pointers such as 11 and 12, by choosing differently coloured luminous materials for the different parts of the dial the different scales can have differently coloured illumination, the differently coloured parts having their own electrodes which are individually switched to the energising potential source by the normally provided range change switch of the receiver. In all cases the necessary connecting wires may be covered so as to be optically masked.

If a series of dials, to appear one at a time in the window of an escutcheon, for example, is required they may be mounted on a polygonal rotatable carrier so that only one at a time appears in the window and the electrode 3 of that dial for the time being may be capacitatively excited through a fixed insulating layer by a fixed further electrode (indicated at 6 in Figure 1) mounted in the appropriate position.

Referring to Figure 3, the circuit for excitation comprises a transistor 20 connected as an oscillator and the luminescent plate connected to constitute a parallel capacity 22 in the oscillatory circuit which also includes inductance 21. In one embodiment of the invention the normally provided local oscillator of a heterodyne receiver is used as the alternating voltage source for the dial arrangement. In an embodiment of this nature if there are a number of switchable wave ranges it is possible so to design the luminous plate portions for the different ranges that their capacities are suitable for use as fixed tuning capacities in the local oscillator circuits, variable tuning being effected by inductance variation. Of course in practice with such an arrangement additional trimming condensers will usually be provided. These may be constituted by adding small pieces of foil on the corresponding parts of the luminescent plate.

#### 50 WHAT WE CLAIM IS:—

1. An illuminated dial having indicia which light up by electro-luminescence provided by a layer of luminous material which is placed between two electrodes, the electrode towards the observer consisting of a metal wire in the shape of the required indicia and the arrangement being such that an electrical field formed between the two electrodes activates the luminous layer to light up to a width which is greater than the diameter of the wire which appears dark.

2. A dial as claimed in claim 1 and wherein there is a plurality of groups of indicia each group having its own separately connectable electrodes whereby any one desired group may be caused to illuminate by applying alternating current voltage between its electrodes.

3. A dial as claimed in claim 2 and wherein each group of indicia relates to a different wave-band and at any one time only that group which relates to a selected wave-band is fed with an alternating current voltage.

4. A dial as claimed in any of the above claims and wherein the individual symbols of the indicia are connected to a common bus bar in the form of a straight wire running across the dial.

5. A dial as claimed in claim 4 and wherein a dark pointer is arranged above the dial to intercept the straight wire which lights up in use to form a common straight base line across the dial.

6. A dial as claimed in any of claims 1 to 4 and wherein all connecting leads are optically masked.

7. In combination a plurality of dials in accordance with the preceding claims, means for moving the same to bring any chosen one of them into a position in which it can be viewed and an additional fixed electrode mounted and arranged to energise the dial for the time being in the viewable position.

8. A combination as claimed in claim 7 and wherein alternating voltage energy is fed from the said fixed electrode to one of the electrodes of the dial for the time being in the viewable position, capacitatively via interposed insulation.

9. In combination a dial as claimed in any of the preceding claims 1 to 6 and an energising oscillator therefor, said dial being connected and arranged to constitute a capacitance in the oscillatory circuit of said oscillator.

10. A heterodyne receiver including a dial and oscillator combination as claimed in claim 9 and wherein the oscillator is also the local oscillator of said heterodyne receiver.

11. A tuning range switchable heterodyne receiver including a dial and oscillator combination as claimed in claim 9 wherein the dial is in a plurality of parts, one for each range, each part providing a different predetermined capacitance so dimensioned as to be adapted to impart to the local oscillator circuit a resonant frequency suited to the range for which the part in question is to act as a tuning indicator, means for switching the different dial-capacitances individually into said oscillator circuit to establish the different

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individual tuning ranges, and a variable tuning indicator in said circuit.

12. Illuminated dials and receivers including the same substantially as herein described  
5 with reference to the accompanying drawings.

M. J. RANTZEN,  
Chartered Patent Agent,  
Marconi House, New Street,  
Chelmsford, Essex,  
Agent for the Applicants.

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1010134 COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of  
the Original on a reduced scale*

